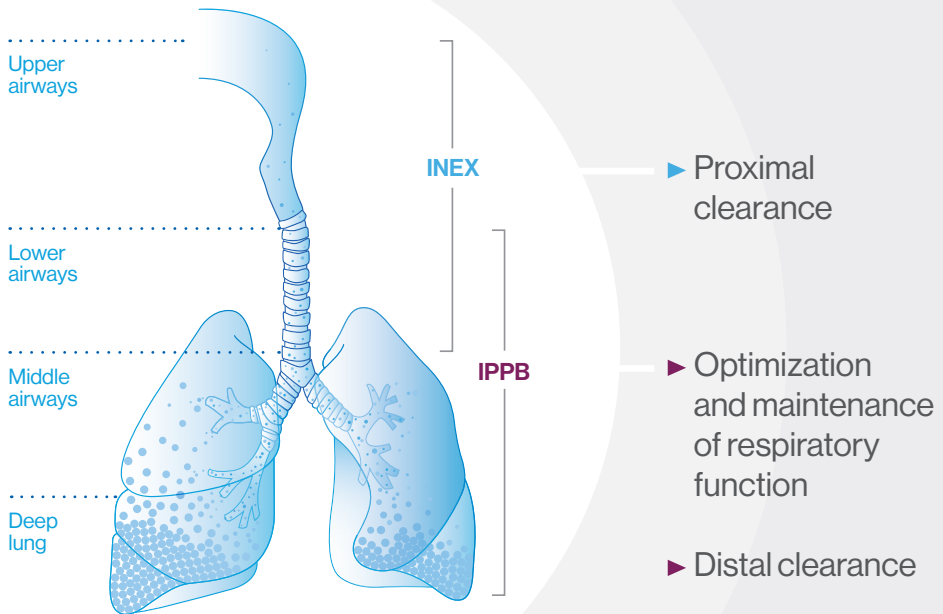


## Help with EO-70 Settings



# The EO-70 is a versatile device combining complementary treatments

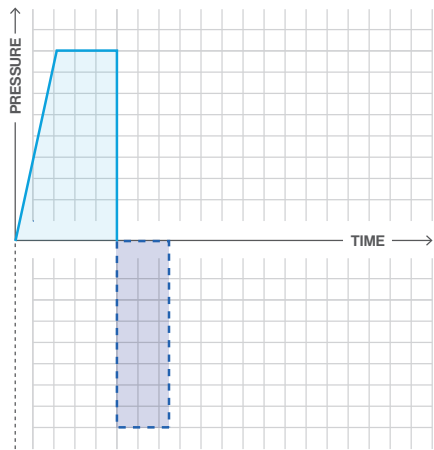


# Mode Description

## INEX

Mechanical in-exsufflation provides positive pressure, followed very quickly by negative pressure, which assists coughing.

MI-E simulates coughing due to pressure variation in a non-invasive form.

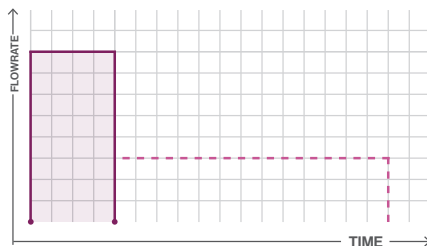


## IPPB = Intermittent Positive Pressure Breathing

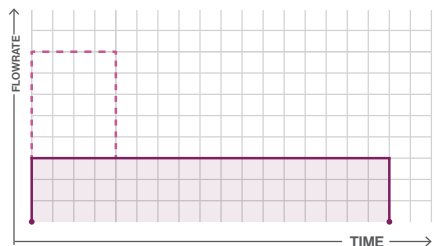
This *recruitment mode* delivers an air volume beyond the patient tidal volume and close to his maximum lung capacity. It enables the patient to reach the inspiratory reserve volume. This improves pre-cough volume and mobilizes the thoracic wall.

### The selected flow rate modulates the inspiratory cycle time

Two possible options depending on the treatment objective



The **high-flow** setting **effectively delivers** a volume of air over a reduced inspiratory time.



**Slow insufflation** allows **maximum intake** in all lung areas to reach the inspiratory reserve volume.

## Indications

### Indications

INEX

It is intended in adult or pediatric patients who have difficulty removing secretions and/or inability to cough (Peak Flow <270 L/min).

Some examples of diseases that may benefit from therapy are:

- Thoracic wall diseases
- Neuromuscular diseases
- Spinal cord injuries

### Indications

IPPB

It is designed for adult or pediatric patients who require passive thoracic-pulmonary mobilization and for those who struggle with secretion removal due to ineffective coughing.

## General contraindications to INEX and IPPB

Hemoptysis, pneumothorax, severe emphysema and recent lobectomy, increased intracranial pressure, altered consciousness, lack of cooperation, severe bulbar palsy, cardiac instability, esophageal fistula, rib fractures.

INEX Settings		Description
Operating modes Insp.	AUTO / MANUAL	The Auto Mode delivers the therapy according to the settings of: Inspiration Pressure, Exhalation Pressure, Inspiration Time, Exhalation Time, Pause Time, PEEP and Rise Time. In the Manual Mode, the operator will determine the inspiration and exhalation time by switching the touchpad to the left (triggers an inspiration) and to the right (triggers an exhalation).
Inh. Pressure (cmH <sub>2</sub> O)	5 - 70	Positive pressure applied in mechanical inflation.
Inh. Slope	0 - 5	Speed at which the pressure will be reached: 0 (200 msec), 1 (½ of Ti), 2 (⅔ of Ti), 3 (¾ of Ti), 4 (¾ of Ti), 5 (Ti).
Inh Time (s)*	0.5 - 5	Time that positive inspiratory pressure is applied.
Oscillation Freq. (Hz)	4 - 20	Hertz (beats per sec). Higher frequency less patient sensation.
Insp. Oscillation Amp.	1 - 3	1 (2± 10% of pressure set), 2 (4± 10% of pressure set), 3 (6± 10% of pressure set). Higher oscillation stronger patient sensation.
Trigger* Not compatible with timed Pause	OFF/1 - 3	1 (3 cmH <sub>2</sub> O), 2 (5 cmH <sub>2</sub> O), 3 (12 cmH <sub>2</sub> O)**
Exh. Pressure (cmH <sub>2</sub> O)	0 to -70	Negative pressure applied in mechanical exsufflation.
Exh. Time (s)*	0.5 - 5	Time that negative expiratory pressure is applied.
Exhal. Oscillation Freq. (Hz)	4 - 20	Hertz (beats per sec). Higher frequency less patient sensation.
Exhal. Oscillation Amp.	1 - 3	1 (2± 10% of pressure set), 2 (4± 10% of pressure set), 3 (6± 10% of pressure set). Higher oscillation stronger patient sensation.
Pause (s)* Not compatible with Trigger	OFF/0.5 - 5	Pause time between each cough cycle (insufflation/exsufflation/ pause).
PEEP (cmH <sub>2</sub> O)	OFF/1 to 20	PEEP during the Pause time.
Cycles Nb*	1 to 20	Number of cough cycles.
Treatment End*	Inspiration/ Exhalation	Determine the phase that will end the therapy (after insufflation or after exsufflation).

\* Only applies in AUTO mode.

\*\* The values could vary according to the PEEP setting and they should be considerate as a variation from the current pressure value.

IPPB Settings		Description
Flow (L/min)	5 - 100	Insufflation speed
Inh. Slope	ON/OFF	When ON, the flow is decreasing during the inhalation phase, proportionally to the increase of the pressure until reaching 50% of the set flow when the max pressure is reached.
Pressure Max. (cmH <sub>2</sub> O)	10 - 50	Maximum pressure that can be achieved during inhalation. Once reached, exhalation follows.
Inh. Trig.	OFF/1 - 8	1 (more sensitive) - 8 (less sensitive).
PEEP (cmH <sub>2</sub> O)	OFF/4 - 20	Positive pressure during pause.
Exh Slope	0 - 5	The time of linear reduction of Max Insp Pressure to PEEP. In the setting 0 - no resistance to exhalation. 0 (1 sec), 1 (2 sec), 2 (3 sec), 3 (4 sec), 4 (5 sec), 5 (6 sec).
Inh. Max Time (s)	0.5 - 20	Maximum inspiratory phase time. If the patient has not reached the max pressure at the end of the maximum inspiratory time, the cycle will proceed to expiration.
Treatment time (min)	OFF/5-30	Duration of therapy.

IPPB Note: For optimal adaptation, it is important to calibrate the circuit with an exhalation port, in case of failure using a mouthpiece, use a non-ventilated NIV mask, set a PEEP of 4 cmH<sub>2</sub>O and a minimum expiratory slope of 1. It's essential to monitor the unintentional leaks during the therapy.

## Start a session: define comfort settings

### INEX

Help the patient identify the inspiratory and expiratory phases so that he/she can synchronize as much as possible.

#### Reassure the patient:

1

The EO-70 will deliver air to you.

2

Allow yourself to be inflated, but it is important that this is comfortable for you.

3

Then, the EO-70 will suck out the air very quickly.

4

During this phase, I will ask you to exhale or cough. I will help you if necessary.

## Start a session: define comfort settings

### IPPB

Reinforce the importance of allowing passive insufflation through the flow delivered by the equipment.

#### Reassure the patient:

1

As you start breathing in through the mouthpiece, the EO-70 will deliver air to you.

2

Allow yourself to be inflated by the device, **without forcing yourself to breathe in.**

3

When the device stops delivering air, you can exhale.

4

The exercise will take place at your pace: you decide when to start breathing in again.

duration: 5 to 15 min

# ▶ Recommendations for treatment

INEX

▶ Settle the patient into position based on their functional state:

- In a half-seated position in a bed
- Sitting in a chair

▶ Opt for a position where the practitioner can easily apply manual coughing assistance in addition to the mechanical assistance

▶ If necessary, choose a personalized signal with the patient to indicate when to pause the insufflations (e.g. a wink)

▶ Ideally, use a mask that covers the nose and mouth with the INEX function

▶ Guide the patient with clear instructions:

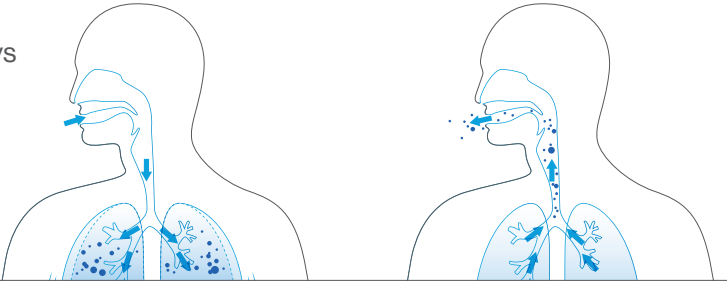
- Inhale or inflate
- Cough hard

▶ Use the Coaching Mode with the chameleon to help the patient synchronize with the device



► Objective

To support an ineffective cough to clear the airways



Settings

Recommended settings:

Installation settings	
Patient on NIV	Patient not on NIV
Initiate at: $P_i = PIP + 5 \text{ cmH}_2\text{O}$ $P_e = -(PIP + 10 \text{ cmH}_2\text{O})$	Initiate at: $P_i = 15 \text{ cmH}_2\text{O}$ $P_e = -20 \text{ cmH}_2\text{O}$
$T_i = T_e = T_i (\text{NIV}) + 0.5 \text{ s}$ Pause = 1 sec	$T_i = T_e = 1 \text{ sec}$ Pause = 1 sec

Adjustment:

Inspiratory and expiratory pressures and times must be individualized and gradually increased until efficacy is achieved.

The  $T_i/T_e$  ratio must be adjusted according to the disease and the context.

The  $P_{insp}$  must be less than the  $P_{exp}$  to favor a expiratory phase.

Dose

Depends on the extent of the congestion,  
**example:** 2 to 5 sets of 5 cycles each.

Post-treatment clinical assessment

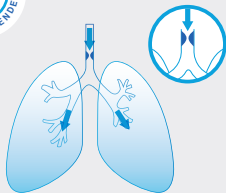
Improvement of the PCF, audible secretions, secretions in the upper airways.

It could be used during a non-invasive or invasive ventilation using endotracheal tube or tracheotomy.

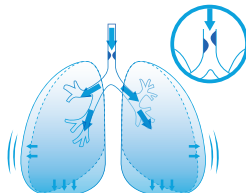
## ► Objective

To increase inspiratory volume to facilitate effective coughing.

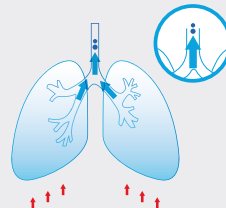
IPPB enhances pre-cough volume to facilitate coughing.



High-flow inspiration



Deep inspiration



Secretion clearance

## Settings

### Recommended settings:

Flowrate: 30–50 L/min    Max pressure: 30 to 40 cmH<sub>2</sub>O

### Adjustment:

Carried out by the physiotherapist during the session:

- The flowrate and pressure must be individualized and gradually increased until a satisfactory pre-cough volume is achieved that enables effective coughing.
- PEEP: in the absence of abdominal deficiencies, increase PEEP gradually.

### Dose

1 to 4 times a day depending on the congestion  
Perform 2 to 5 movements followed by a cough;  
pause when the patient needs a break.

### Post-treatment clinical assessment

Sputum, displayed volume increased, patient  
clinical improvement, auscultation.

### Target patients

Congested patients with neuromuscular  
impairment: myopathy, tetraplegia.  
Any congested patient whose dyspnea  
and/or exhaustion makes manual drainage  
ineffective.

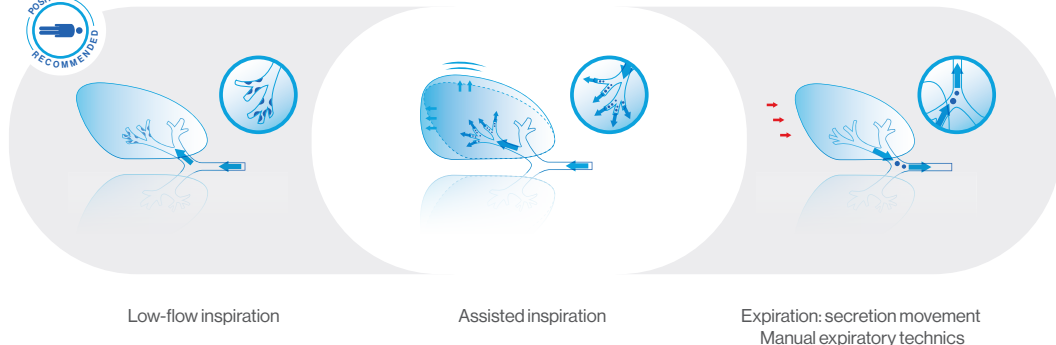
# Distal clearance

## Mobilize secretions

IPPB

### ► Objective

To mobilize secretions present in the distal parts of the lung areas.



## Settings

### Recommended settings:

Flowrate: 20 to 30 L/min    Max pressure: 25 to 35 cmH<sub>2</sub>O

### Adjustment:

If the pressure is reached too quickly or if the current volume displayed is too low: increase the inspiratory time by decreasing the flowrate and/or by adjusting the pressure gradually.

### Dose

1 to 4 times a day depending on the extent of the congestion.

Perform 2 to 5 insufflations followed by a cough; pause when the patient needs a break.

### Post-treatment clinical assessment

Sputum, displayed volume increased, patient clinical improvement, auscultation.

### Target patients

Congested patients with neuromuscular impairment: myopathy, tetraplegia.

Any congested patient whose dyspnea and/or exhaustion makes manual drainage ineffective.

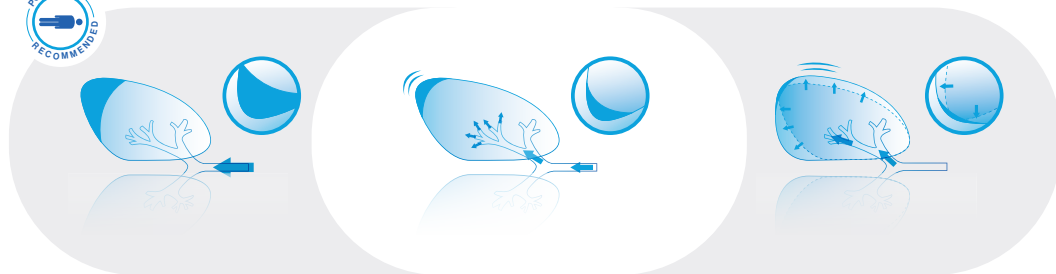
# Respiratory function optimization

## Prevention of ventilation disorders

IPPB

### ► Objective

To maintain or develop ventilation in hypoventilated lung areas.



Slow inspiration

Assisted slow inspiration

Posture to maximize inspiration

## Settings

### Recommended settings:

Flowrate: 10 to 30 L/min    Max pressure: 25 to 35 cmH<sub>2</sub>O

### Adjustment:

Performed according to the identified or suspected hypoventilation area:

- Flowrate: minimum
- Maximum pressure: gradual titration of the pressure in order to optimize the inspired volume.

### Dose

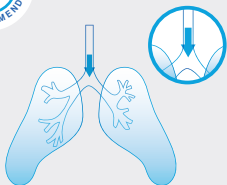
10 to 30 minutes per day, 5 days a week

### Target patients

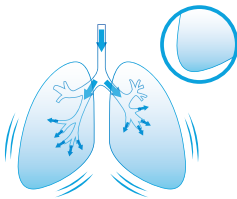
- Neuromuscular diseases
- Multiple disabilities
- Pre-surgery, post-surgery
- Any patient whose respiratory function is severely decreased, with sustained volume reduction

## ► Objective

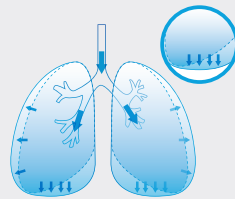
To mobilize the chest cavity and let in as much air as possible.



Slow inspiration



Assisted inspiration



Posture to maximize inspiration

## Settings

### Recommended settings:

Flowrate: 20 to 35 L/min    Max pressure: 30 to 40 cmH<sub>2</sub>O

### Adjustment:

Depending on the volumes measured:

- Flowrate: increase or decrease depending on how the patient feels
- Max pressure: if resistance is high, do not hesitate to significantly decrease the pressure.

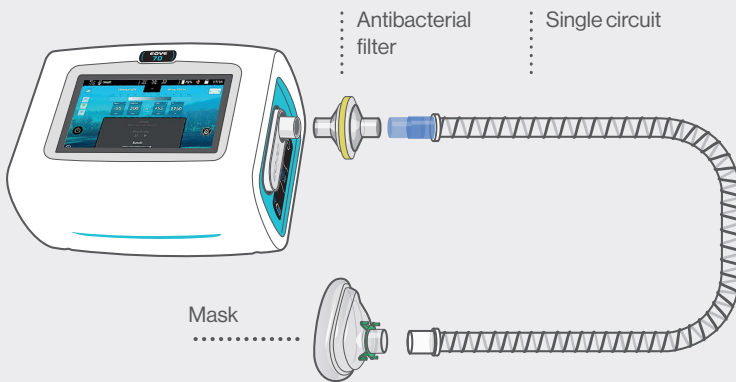
### Dose

10 to 30 minutes per day, 5 days a week.

### Target patients

- Neuromuscular diseases
- Multiple disabilities
- Pre-surgery, post-surgery
- Any patient whose respiratory function is severely decreased, with sustained volume reduction

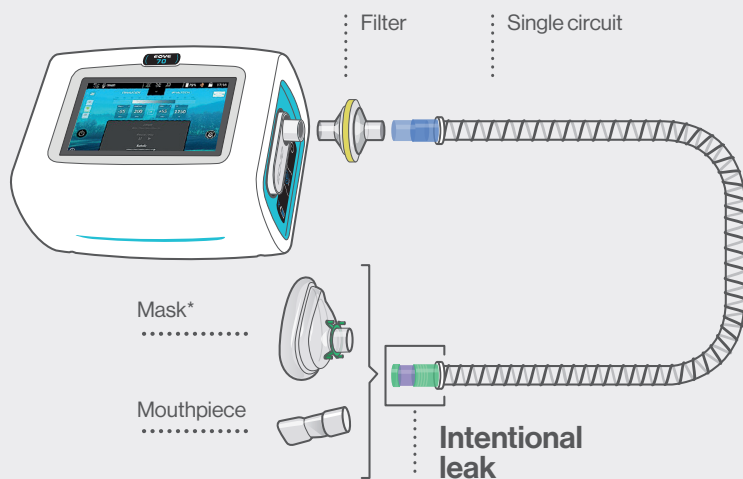
## Assembly of the patient circuit



### INEX mode

1. Attach the antibacterial filter to the inspiratory port of the device.
2. Connect the circuit (22 mm) to the other side of the filter.
3. Perform a circuit calibration.
4. Connect the patient interface to the other end of the circuit.

## Assembly of the patient circuit



### IPPB mode

1. Attach the antibacterial filter to the inspiratory port of the device.
2. Connect the circuit (22 mm) to the other side of the filter.
3. Connect the **leak port** to the other side of the patient circuit.
4. Perform a circuit calibration
5. Connect the patient interface to the other end of the circuit.

\* For patient comfort, it is possible to use a non-ventilated mask.

## References

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- 3 AARC Clinical Practice Guideline. Intermittent Positive Pressure Breathing: 2003 Revision & Update. Sorenson HM, Shelledy DC, AARC.
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- 6 Respiratory Med, 2018. Airway clearance techniques in neuromuscular disorders: A state of the art review. Chatwin M, Toussaint M, Gonçalves M, Mellies N, Gonzales-Bermejo J, Sancho J, Fauroux B, Andersen T, Hov B, Nygren-Bonnier M, Lacombe M, Pernet K, Kampelmachern K, Devaux C, Kinnett K, Sheehan D, Rao F, Villanova M, Berlowitz D, Morrow B.

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